

$\omega(1650)$ $I^G(J^{PC}) = 0^-(1^- -)$ **$\omega(1650)$ MASS**

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1670 ± 30 OUR ESTIMATE				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1667 ± 13 ± 6		AUBERT 07AU BABR	10.6 $e^+ e^- \rightarrow \omega \pi^+ \pi^- \gamma$	
1645 ± 8	13	AUBERT 06D BABR	10.6 $e^+ e^- \rightarrow \omega \eta \gamma$	
1660 ± 10 ± 2		AUBERT,B 04N BABR	10.6 $e^+ e^- \rightarrow \pi^+ \pi^- \pi^0 \gamma$	
1770 ± 50 ± 60	1.2M	¹ ACHASOV 03D RVUE	0.44–2.00 $e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$	
1619 ± 5		² HENNER 02 RVUE	1.2–2.0 $e^+ e^- \rightarrow \rho \pi, \omega \pi \pi$	
1700 ± 20		EUGENIO 01 SPEC	18 $\pi^- p \rightarrow \omega \eta n$	OCCUR=2
1705 ± 26	612	³ AKHMETSHIN 00D CMD2	$e^+ e^- \rightarrow \omega \pi^+ \pi^-$	
1820^{+190}_{-150}		⁴ ACHASOV 98H RVUE	$e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$	
1840^{+100}_{-70}		⁵ ACHASOV 98H RVUE	$e^+ e^- \rightarrow \omega \pi^+ \pi^-$	OCCUR=2
1780^{+170}_{-300}		⁶ ACHASOV 98H RVUE	$e^+ e^- \rightarrow K^+ K^-$	OCCUR=3
~ 2100		⁷ ACHASOV 98H RVUE	$e^+ e^- \rightarrow K_S^0 K^\pm \pi^\mp$	OCCUR=4
1606 ± 9		⁸ CLEGG 94 RVUE		OCCUR=5
1662 ± 13	750	⁹ ANTONELLI 92 DM2	1.34–2.4 $e^+ e^- \rightarrow \rho \pi, \omega \pi \pi$	OCCUR=4
1670 ± 20		ATKINSON 83B OMEG	20–70 $\gamma p \rightarrow 3\pi X$	
1657 ± 13		CORDIER 81 DM1	$e^+ e^- \rightarrow \omega 2\pi$	
1679 ± 34	21	ESPOSITO 80 FRAM	$e^+ e^- \rightarrow 3\pi$	
1652 ± 17		COSME 79 OSPK	$e^+ e^- \rightarrow 3\pi$	

¹ From the combined fit of ANTONELLI 92, ACHASOV 01E, ACHASOV 02E, and ACHASOV 03D data on the $\pi^+ \pi^- \pi^0$ and ANTONELLI 92 on the $\omega \pi^+ \pi^-$ final states. Supersedes ACHASOV 99E and ACHASOV 02E.

² Using results of CORDIER 81 and preliminary data of DOLINSKY 91 and ANTONELLI 92.

³ Using the data of AKHMETSHIN 00D and ANTONELLI 92. The $\rho \pi$ dominance for the energy dependence of the $\omega(1420)$ and $\omega(1650)$ width assumed.

⁴ Using data from BARKOV 87, DOLINSKY 91, and ANTONELLI 92.

⁵ Using the data from ANTONELLI 92.

⁶ Using the data from IVANOV 81 and BISELLO 88B.

⁷ Using the data from BISELLO 91C.

⁸ From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.

⁹ From the combined fit of the $\rho \pi$ and $\omega \pi \pi$ final states.

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VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
315 ± 35 OUR ESTIMATE				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
222 ± 25 ± 20		AUBERT 07AU BABR	10.6 $e^+ e^- \rightarrow \omega \pi^+ \pi^- \gamma$	
114 ± 14	13	AUBERT 06D BABR	10.6 $e^+ e^- \rightarrow \omega \eta \gamma$	
230 ± 30 ± 20		AUBERT,B 04N BABR	10.6 $e^+ e^- \rightarrow \pi^+ \pi^- \pi^0 \gamma$	
$490^{+200}_{-150} \pm 130$	1.2M	¹⁰ ACHASOV 03D RVUE	0.44–2.00 $e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$	
250 ± 14		¹¹ HENNER 02 RVUE	1.2–2.0 $e^+ e^- \rightarrow \rho \pi, \omega \pi \pi$	
250 ± 50		EUGENIO 01 SPEC	18 $\pi^- p \rightarrow \omega \eta n$	
370 ± 25	612	¹² AKHMETSHIN 00D CMD2	$e^+ e^- \rightarrow \omega \pi^+ \pi^-$	
113 ± 20		¹³ CLEGG 94 RVUE		
280 ± 24	750	¹⁴ ANTONELLI 92 DM2	1.34–2.4 $e^+ e^- \rightarrow \rho \pi, \omega \pi \pi$	
160 ± 20		ATKINSON 83B OMEG	20–70 $\gamma p \rightarrow 3\pi X$	
136 ± 46		CORDIER 81 DM1	$e^+ e^- \rightarrow \omega 2\pi$	
99 ± 49	21	ESPOSITO 80 FRAM	$e^+ e^- \rightarrow 3\pi$	
42 ± 17		COSME 79 OSPK	$e^+ e^- \rightarrow 3\pi$	

- 10 From the combined fit of ANTONELLI 92, ACHASOV 01E, ACHASOV 02E, and ACHASOV 03D data on the $\pi^+ \pi^- \pi^0$ and ANTONELLI 92 on the $\omega \pi^+ \pi^-$ final states. Supersedes ACHASOV 99E and ACHASOV 02E.
- 11 Using results of CORDIER 81 and preliminary data of DOLINSKY 91 and ANTONELLI 92.
- 12 Using the data of AKHMETSHIN 00D and ANTONELLI 92. The $\rho\pi$ dominance for the energy dependence of the $\omega(1420)$ and $\omega(1650)$ width assumed.
- 13 From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.
- 14 From the combined fit of the $\rho\pi$ and $\omega\pi\pi$ final states.

$\omega(1650)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
$\Gamma_1 \rho\pi$	seen
$\Gamma_2 \omega\pi\pi$	seen
$\Gamma_3 \omega\eta$	seen
$\Gamma_4 e^+ e^-$	seen

$\omega(1650) \Gamma(i)\Gamma(e^+e^-)/\Gamma^2(\text{total})$

$\Gamma(\rho\pi)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$	$\Gamma_1/\Gamma \times \Gamma_4/\Gamma$
<u>VALUE (units 10^{-6})</u>	<u>EVTS</u> <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$	
1.3 ± 0.1 ± 0.1	AUBERT,B 04N BABR $10.6 e^+ e^- \rightarrow \pi^+ \pi^- \pi^0 \gamma$
1.2 ± 0.4 ± 0.8 1.2M 15,16	ACHASOV 03D RVUE $0.44-2.00 e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
0.921 ± 0.230	17,18 CLEGG 94 RVUE
0.479 ± 0.050	750 19,20 ANTONELLI 92 DM2 $1.34-2.4 e^+ e^- \rightarrow \rho\pi, \omega\pi\pi$

$\Gamma(\omega\pi\pi)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$	$\Gamma_2/\Gamma \times \Gamma_4/\Gamma$
<u>VALUE (units 10^{-7})</u>	<u>EVTS</u> <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$	
7.0 ± 0.5	AUBERT 07AU BABR $10.6 e^+ e^- \rightarrow \omega\pi^+ \pi^- \gamma$
4.1 ± 0.9 ± 1.3 1.2M 15,16	ACHASOV 03D RVUE $0.44-2.00 e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
5.40 ± 0.95	21 AKHMETSHIN 00D CMD2 $1.2-1.38 e^+ e^- \rightarrow \omega\pi^+ \pi^-$
3.18 ± 0.80	17,18 CLEGG 94 RVUE
6.07 ± 0.61	750 19,20 ANTONELLI 92 DM2 $1.34-2.4 e^+ e^- \rightarrow \rho\pi, \omega\pi\pi$

$\Gamma(\omega\eta)/\Gamma_{\text{total}} \times \Gamma(e^+e^-)/\Gamma_{\text{total}}$	$\Gamma_3/\Gamma \times \Gamma_4/\Gamma$
<u>VALUE (units 10^{-6})</u>	<u>CL%</u> <u>EVTS</u> <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$	
0.57 ± 0.06	13 AUBERT 06D BABR $10.6 e^+ e^- \rightarrow \omega\eta\gamma$
<6	90 22 AKHMETSHIN 03B CMD2 $e^+ e^- \rightarrow \eta\pi^0 \gamma$
15 Calculated by us from the cross section at the peak.	
16 From the combined fit of ANTONELLI 92, ACHASOV 01E, ACHASOV 02E, and ACHASOV 03D data on the $\pi^+ \pi^- \pi^0$ and ANTONELLI 92 on the $\omega\pi^+ \pi^-$ final states. Supersedes ACHASOV 99E and ACHASOV 02E.	
17 From a fit to two Breit-Wigner functions and using the data of DOLINSKY 91 and ANTONELLI 92.	
18 From the partial and leptonic width given by the authors.	
19 From the combined fit of the $\rho\pi$ and $\omega\pi\pi$ final states.	
20 From the product of the leptonic width and partial branching ratio given by the authors.	
21 Using the data of AKHMETSHIN 00D and ANTONELLI 92. The $\rho\pi$ dominance for the energy dependence of the $\omega(1420)$ and $\omega(1650)$ width assumed.	
22 $\omega(1650)$ mass and width fixed at 1700 MeV and 250 MeV, respectively.	

$\omega(1650)$ BRANCHING RATIOS

$\Gamma(\omega\pi\pi)/\Gamma_{\text{total}}$	Γ_2/Γ
<u>VALUE</u>	<u>EVTS</u> <u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>
$\bullet \bullet \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet \bullet \bullet$	
~ 0.35	1.2M 23 ACHASOV 03D RVUE $0.44-2.00 e^+ e^- \rightarrow \pi^+ \pi^- \pi^0$
0.620 ± 0.014	24 HENNER 02 RVUE $1.2-2.0 e^+ e^- \rightarrow \rho\pi, \omega\pi\pi$

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$\Gamma(\rho\pi)/\Gamma_{\text{total}}$					Γ_1/Γ
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 0.65	1.2M	23 ACHASOV	03D RVUE	$0.44 - 2.00 \frac{e^+ e^-}{\pi^+ \pi^- \pi^0}$	
0.380 ± 0.014		24 HENNER	02 RVUE	$1.2 - 2.0 \frac{e^+ e^-}{\rho\pi, \omega\pi\pi}$	

$\Gamma(e^+ e^-)/\Gamma_{\text{total}}$					Γ_4/Γ
VALUE (units 10^{-7})	EVTS	DOCUMENT ID	TECN	COMMENT	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
~ 18	1.2M	24,25 ACHASOV	03D RVUE	$0.44 - 2.00 \frac{e^+ e^-}{\pi^+ \pi^- \pi^0}$	
23 ± 1		24 HENNER	02 RVUE	$1.2 - 2.0 \frac{e^+ e^-}{\rho\pi, \omega\pi\pi}$	

23 From the combined fit of ANTONELLI 92, ACHASOV 01E, ACHASOV 02E, and ACHASOV 03D data on the $\pi^+ \pi^- \pi^0$ and ANTONELLI 92 on the $\omega\pi^+ \pi^-$ final states. Supersedes ACHASOV 99E and ACHASOV 02E.

24 Assuming that the $\omega(1650)$ decays into $\rho\pi$ and $\omega\pi\pi$ only.

25 Calculated by us from the cross section at the peak.

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$\omega(1650)$ REFERENCES			
AUBERT	07AU	PR D76 092005	B. Aubert <i>et al.</i> (BABAR Collab.)
AUBERT	06D	PR D73 052003	B. Aubert <i>et al.</i> (BABAR Collab.)
AUBERT,B	04N	PR D70 072004	B. Aubert <i>et al.</i> (BABAR Collab.)
ACHASOV	03D	PR D68 052006	M.N. Achasov <i>et al.</i> (Novosibirsk SND Collab.)
AKHMETSHIN	03B	PL B562 173	R.R. Akhmetshin <i>et al.</i> (Novosibirsk CMD-2 Collab.)
ACHASOV	02E	PR D66 032001	M.N. Achasov <i>et al.</i> (Novosibirsk SND Collab.)
HENNER	02	EPJ C26 3	V.K. Henner <i>et al.</i>
ACHASOV	01E	PR D63 072002	M.N. Achasov <i>et al.</i> (Novosibirsk SND Collab.)
EUGENIO	01	PL B497 190	P. Eugenio <i>et al.</i>
AKHMETSHIN	00D	PL B489 125	R.R. Akhmetshin <i>et al.</i> (Novosibirsk CMD-2 Collab.)
ACHASOV	99E	PL B462 365	M.N. Achasov <i>et al.</i> (Novosibirsk SND Collab.)
ACHASOV	98H	PR D57 4334	N.N. Achasov, A.A. Kozhevnikov
CLEGG	94	ZPHY C62 455	A.B. Clegg, A. Donnachie (LANC, MCHS)
ANTONELLI	92	ZPHY C56 15	A. Antonelli <i>et al.</i> (DM2 Collab.)
BISELLO	91C	ZPHY C52 227	D. Bisello <i>et al.</i> (DM2 Collab.)
DOLINSKY	91	PRPL 202 99	S.I. Dolinsky <i>et al.</i> (NOVO)
BISELLO	88B	ZPHY C39 13	D. Bisello <i>et al.</i> (PADO, CLER, FRAS+)
BARKOV	87	JETPL 46 164	L.M. Barkov <i>et al.</i> (NOVO)
ATKINSON	83B	PL 127B 132	M. Atkinson <i>et al.</i> (BONN, CERN, GLAS+)
CORDIER	81	PL 106B 155	A. Cordier <i>et al.</i> (ORsay)
IVANOV	81	PL 107B 297	P.M. Ivanov <i>et al.</i> (NOVO)
ESPOSITO	80	LNC 28 195	B. Esposito <i>et al.</i> (FRAS, NAPL, PADO+)
COSME	79	NP B152 215	G. Cosme <i>et al.</i> (IPN)

Translated from ZETFP 46 132.

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